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## Making a difference: 5 years of Cardiac Surgery Intersociety Alliance (CSIA)

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### Summary

Informed by the almost unimaginable unmet need for cardiac surgery in the developing regions of the world, leading surgeons, cardiologists, editors in chief of the major cardiothoracic journals as well as representatives of medical industry and government convened in December 2017 to address this unacceptable disparity in access to care. The ensuing "Cape Town Declaration" constituted a clarion call to cardiac surgical societies to jointly advocate the strengthening of sustainable, local cardiac surgical capacity in the developing world. The Cardiac Surgery Intersociety Alliance (CSIA) was thus created, comprising The Society of Thoracic Surgeons (STS), the American Association for Thoracic Surgery (AATS), the Asian Society for Cardiovascular and Thoracic Surgery (ASCVTS), the European Association for Cardio-Thoracic Surgery (EACTS) and the World Heart Federation (WHF). The guiding principle was advocacy for sustainable cardiac surgical capacity in low-income countries. As a first step, a global needs assessment confirmed rheumatic heart disease as the overwhelming pathology requiring cardiac surgery in these regions. Subsequently, CSIA published a request for proposals to support fledgling programmes that could demonstrate the backing by their governments and health care institution. Out of 11 applicants, and following an evaluation of the sites, including site visits to the 3 finalists, Mozambique and Rwanda were selected as the first Pilot Sites. Subsequently, a mentorship and training agreement was completed between Mozambique and the University of Cape Town, a middle-income country with a comparable burden of rheumatic heart disease. The agreement entails regular video calls between the heart teams, targeted training across all aspects of cardiac surgery, as well as on-site presence of mentoring teams for complex cases with the strict observance of 'assisting only'. In Rwanda, Team Heart, a US and Rwanda-based non-governmental organization (NGO) that has been performing cardiac surgery in Rwanda and helping to train the cardiac surgery workforce since 2008, has agreed to continue providing mentorship for the local team and to assist in the establishment of independent cardiac surgery with all that entails. This involves intermittent virtual conferences between Rwandan and US cardiologists for surgical case selection. Five years after CSIA was founded, its 'Seal of Approval' for the sustainability of endorsed programmes in Mozambique and Rwanda has resulted in higher case numbers, a

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**Table 1:** Evolution of CSIA's role since its inception at the example of Mozambique as one of the 2 selected CSIA pilot sites

Event	Parties involved	Date	Publication
'CPT Declaration' calling for the establishment of 'CSIA'	Participants of 50th anniversary of 1st HTX; Society Presidents; Editors in Chief	December 2017	[1]
Ratification by Societies	STS; AATS; ASCVTS; EACTS; WHF	January 2018 to February 2019	
Need assessment: surgery for RHD	13 LMICs; 3 HICs CSIA 32—author study	August 2018	[2, 3]
'Call' for submissions to become a 'Pilot Site'	Defining 5 pillars of CSIA support	July 2019	[51]
Submissions	(i) FMI Kabul, Afghanistan; (ii) AIIMS Delhi, India; (iii) Tenwek, Kenya; (iv) Univ. Hosp Ilorin, Nigeria (v) Windhoek Central Hospital, Namibia; (iv) Maputo Central, Mozambique; (vii) King Faisal; Kigali, Rwanda; (viii) Tygerberg Hosp, Stellenbosch, South Africa; (ix) Mulago Hospital, Uganda; (x) Univ. Hosp. Lusaka; Zambia; (xi) Pariranyata Hosp, Harare; Zimbabwe	July to September 2019	
Site visits/site selection	King Faisal Hospital, Kigali, Rwanda (selected) Maputo Central Hospital, Mozambique (selected) Parirenyatwa Hospital, Harare, Zimbabwe	February 2020	[52]
'MV Repair' training in Cape Town	Senior CT-surgeon from Maputo	March 2020	
COVID pandemic	No surgery	April 2020 to August 2021	
Initiation of 'Registry for RHD'	UCT—Maputo/Kigali	March 2021	
Intensive hands-on 'TEE course'	10 members of Maputo team	November 2021	
Participation in 'UCT's Journal Club' and echo teaching programme	Cardiologists and fellows of Maputo	Since February 2022	
'Refurbishment ICU' Maputo		February to March 2022	
'AATS' Boston 'presentations'	CT-surgeons from Maputo and Kigali	May 2022	
Monthly 'Heart Team meetings' Cape Town-Maputo	Cardiologists, Surgeons, Intensivists	From June 2022	
'Perfusionist exchange' Maputo-Kigali plus consumables provided	Senior perfusionist from Maputo	November 2022	
CSIA 'Presentation ACC/WHF' New Orleans (virtual)	By senior CT surgeon, Maputo	March 2023	
'Mentorship Agreement CSIA' and University of Cape Town (UCT)	Signatories: Department of Health, Eduardo Mondlane Univ., Maputo Central Hospital and UCT	March 2023	
'1st Mentorship Visit' of senior 'UCT Cardiothoracic' and 'Anaesthetic' team	Lined-up difficult cases: surgeons and anaesthetists assisting only	April 2023	
'1st Mentorship Visit' of senior 'UCT Cardiology' team	Joint patient work-up	April 2023	
'CSIA presentation' and 'AATS' attendance: Los Angeles	Both senior Cardiothoracic Surgeons from Kigali and Maputo presenting in person	May 2023	
Submission of major 'CSIA-Dutch Government Grant'	UCT—CSIA (first 2 rounds passed)	May 2023	
Intense 'Perfusionist training' at UCT	Perfusionist team from Maputo	June 2023	
'2nd Mentorship Visit' of senior 'UCT Cardiothoracic', 'Anaesthetic' and 'Intensivist' team	Lined-up difficult cases: senior surgeons and anaesthetists assisting only; senior intensivist	October 2023	
Training of 'Intensivists at UCT'	3 senior intensivists from Maputo	November to December 2023	
Training of 'Cardiologists at UCT'	2 senior cardiologists from Maputo	November to December 2023	
Participation in 'ICCVA-CASSA Congress'	2 cardiologists of Maputo as speakers	November to December 2023	
'CT Fellowship' at 'UCT' (4 months)	Senior CT surgery resident from Maputo	April to July 2024	

AATS: American Association for Thoracic Surgery; ACC: American College of Cardiology; AIIMS: All India Institute of Medical Sciences; ASCVTS: Asian Society for Cardiovascular and Thoracic Surgery; COVID: coronavirus disease; CPT: Cape Town; CSIA: Cardiac Surgery Intersociety Alliance; EACTS: The European Association for Cardio-Thoracic Surgery; FMI: French Medical Institute; HIC: high-income country; HTX: Heart transplant; ICCVA-CASSA: International Congress of Cardiothoracic and Vascular Anesthesia-Cardiac Arrhythmia Society of Southern Africa; ICU: Intensive care unit; LMICs: low- to middle-income countries; MV: Mitral valve; RHD: rheumatic heart disease; STS: The Society of Thoracic Surgeons; TEE: Trans-esophageal echocardiography; UCT: University of Cape Town; WHF: World Heart Federation.

where the high costs of such items is the most limiting factor. Here, too, donations exceeded expectations but so did government responses to match this largesse.

- The fact that funding of staff exchanges and teaching programmes through society foundations such as Thoracic Surgery Foundation (TSF) or the American Association for Thoracic Surgery (AATS) Foundation was denominated in

US Dollars had an additional multiplier effect against the depreciating currencies of developing countries

## PROGRESS REPORT

Given the legitimate prudence of the societies towards entering the parquet of health policy in developing countries and also





**Figure 3:** Mentored cardiac surgery performed in Rwanda by Rwandan team.

towards the hitherto untested structure of an intersociety alliance the in-depth multi-society review—overlapping with the pandemic—dedicated the initial years to getting all framework conditions resolved.

Donated equipment, supplies and mentorship efforts have been made possible by the TSF (the charitable arm of the Society of Thoracic Surgeons) and Edwards Lifesciences through their 'Every Heartbeat Matters' philanthropic programme. TSF provided the seed-funds for CSIA activities. Significantly, equally in October 2022, '100 heart valves' were donated to CSIA—50 by Artivion Inc, directed to the programme in Mozambique, and 50 by CorCym, directed to Rwanda. As had been desired, these critical donations were the basis for the Government to permit a significant 'increase in the number of performed operations'. As the emphasis of CSIA support is on the strengthening of local cardiac surgical capacity, the principle of surgery being conducted by local surgeons and their teams was upheld throughout (Figs 3 and 4).

'Mozambique' is one of the poorest countries in the world, ranking 181 out of 189 countries on the human development index. As part of the CSIA initiative:

- Being a middle-income institution, the UCT/Groote Schuur Hospital took on 'mentorship' for Maputo Central Hospital/ Eduardo Mondlane University (Fig. 1, Table 1).
- 'Resident training' at high-volume Institutions in India and China are being initiated. A Fellowship for a senior resident of the cardiac surgical team of Maputo Central has been arranged at UCT for 2024.
- Staff 'training at tertiary institution with significant share of RHD' have been a major focus of CSIA's role in Mozambique (see Table 1). Starting in June 2023, the teams in Cape Town and Maputo have also instituted monthly video conferences in which challenging surgical 'cases are presented' and discussed among the heart teams of both institutions. 'Telephonic direct lines for intraoperative advice' have equally been established and utilized. As part of the agreement with the minister of health, CSIA efforts were 'matched by the government' by the purchase of a 'second heart lung machine, 120 additional oxygenators' and 20 'additional mechanical valve prostheses'. A 'state-of-the-art modern cardiac' intensive care unit (ICU) is currently being



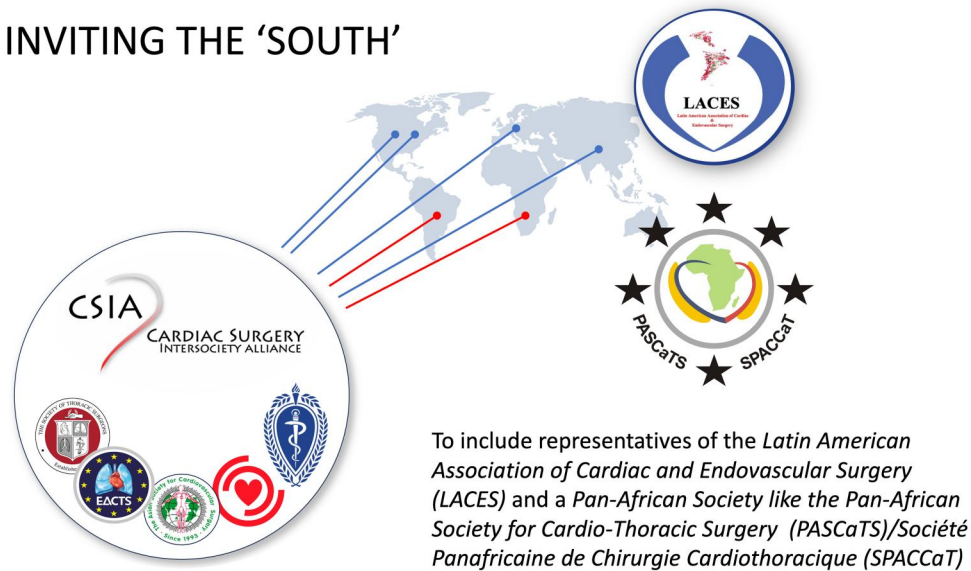
**Figure 4:** Mentorship visit by team of the University of Cape Town at Maputo Central Hospital, Eduardo Mondlane University, Mozambique. While scrubbed in, the University of Cape Town team strictly observed the principle of the local team performing the operation.

built. Since then, intra-bypass anaesthetics could be switched to from iv to isoflurane on the new heart lung machine for the training of which the 'perfusionist' team from Mozambique spent time in Cape Town. Further extended training visits of Mozambiquean specialist and support staff at UCT and mentoring visits of Cardiothoracic, Anaesthetic, Cardiology and Intensivist teams from UCT have become increasingly frequent.

- Overall, CSIA's involvement in Mozambique has had the effect not only of 'qualitatively' strengthening the CS services of the programme, but also 'quantitatively' as the Government committed itself to almost 'doubling the annual case volume' over the next 2 years. Post-COVID case numbers slowly recovered from 10 in 2021 to 35 in 2022 to 43 in 2023 (including double and triple-valve surgeries) restricted by 1 ICU bed per week. Two ICU beds/week plus the intense staff and support-staff training of the past 18 months promise a noticeable increase of open-heart cases over the next 2 years.

'Rwanda': King Faisal Hospital in Kigali, Rwanda, is the site of the open-heart surgery programme in Rwanda. An NGO, Team Heart, had obtained CSIA's 'seal of approval' for Rwanda as a CSIA pilot site after it had driven the development of local CS capacity in Rwanda for several years. While a young Rwandan surgeon completed his 'general- and cardiothoracic surgery training in South Africa', expatriate teams from Australia, Belgium, USA and Canada enabled CS in more than 500 adult and paediatric patients. After passing the South African board exams, the local surgeon returned to Rwanda in 2019 with Team Heart taking on the mentorship role. COVID interrupted the efforts to establish sustainable CS at King Faisal, too. Since then, 'Team Heart' has completed 5 surgical mentorship trips with the entire 'focus' on preparing the local team to 'perform independent cardiac surgical procedures'. By early 2023, the local heart team at the King Faisal Hospital had crossed the threshold to the performance of independent cardiac surgical procedures, allowing future surgical mentorship trips to 'prepare' them for performing 'operations of increasing complexity'. Strengthening the

## INVITING THE 'SOUTH'



**Figure 5:** When CSIA was established in 2018, neither Latin America nor Africa had fully fledged continent-spanning Cardiac Surgical Societies. As from 2023 CSIA lives up to a global claim by having admitted Latin American Association of Cardiac- and Endovascular Surgery and Pan African Societies for Cardiothoracic Surgery at its meeting during the annual European Association for Cardio-Thoracic Surgery congress in Vienna.

link between the 2 sites, a 'perfusionist' of the 'Mozambiquean' team was invited to travel to Kigali and to participate in the 'Team Heart' mentorship experience. Upon his return to Mozambique, 'Team Heart' donated further heart valves for the Mozambiquean programme, as well as other equipment enabling the Maputo programme to re-initiate their open-heart surgery programme, while they awaited the arrival of the heart valves donated through CSIA.

### CONCLUDING CARDIAC SURGERY INTERSOCIETY ALLIANCE'S INITIAL YEARS OF ACTIVITY

A unique umbrella structure comprising the Society of Thoracic Surgeons (STS), the American Association for Thoracic Surgery (AATS), the Asian Society for Cardiovascular and Thoracic Surgery (ASCVTS), the European Association for Cardio-Thoracic Surgery (EACTS) and the World Heart Federation (WHF) has been created and ratified by all participating societies, whereby each Society appoints 2 representatives and collectively may invite additional 'at large' members to serve on the steering committee. Usually, CSIA delegates have been involved in outreach activities to developing countries before. The administrative seat of CSIA is the 'University of Cape Town'. At the steering committee's meeting at the 2023 EACTS meeting in Vienna, the Latin American Association of Cardiac- and Endovascular Surgery (LACES) and Pan African Societies for Cardiothoracic Surgery (PASCATS) were admitted to the CSIA umbrella to include cardiac surgical representations of the Southern Hemisphere (Fig. 5).

- CSIA, created as a call-to-arms for leaders of CS, cardiology, government and the medical device industry to pool their efforts to increase access to life-saving CS in the developing world, has succeeded in identifying and helping to resource the 'first two pilot programmes' for increasing CS in the

developing world. This achievement has been realized despite all the impediments posed by the COVID pandemic.

- The initial 5 years vindicated the core principle on which the CSIA concept rests: the 'power of advocacy' by an organization that represents the weight of all major cardiac societies. 'Governments feel supported' in the daunting task of establishing one of the most technologically demanding surgical disciplines. 'Donors feel reassured' that structured oversight and a clear end-point guarantee the most effective use of their contributions. 'Staff morale' in mostly isolated out-post programmes gets significantly boosted by feeling embedded in the global cardiac community, thereby significantly lowering the threshold for staff retention.
- Both pilot programmes have 'demonstrated measurable progress' in performing 'independent cardiac surgical procedures'. Support for the sites from hospital and government is highly encouraging: In Mozambique, the Ministry of Health has contributed a 2nd heart lung machine and—in addition to the government-sustained basic CS programme—oxygenators and heart valve prostheses and a state-of-the-art cardiac ICU in order to support the continued performance of open-heart operations. In Rwanda, the King Faisal Hospital has committed to the purchase of all supplies needed for CS, and, in addition, in September, 2023, is renovating an operating theatre for CS. Supply chain issues have also been successfully addressed at both sites.

### WAY FORWARD

CSIA has proven to be a 'powerful tool' for stream-lining the often widely scattered efforts towards sustainable cardiac surgical services in developing countries. CSIA is 'not another NGO'







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